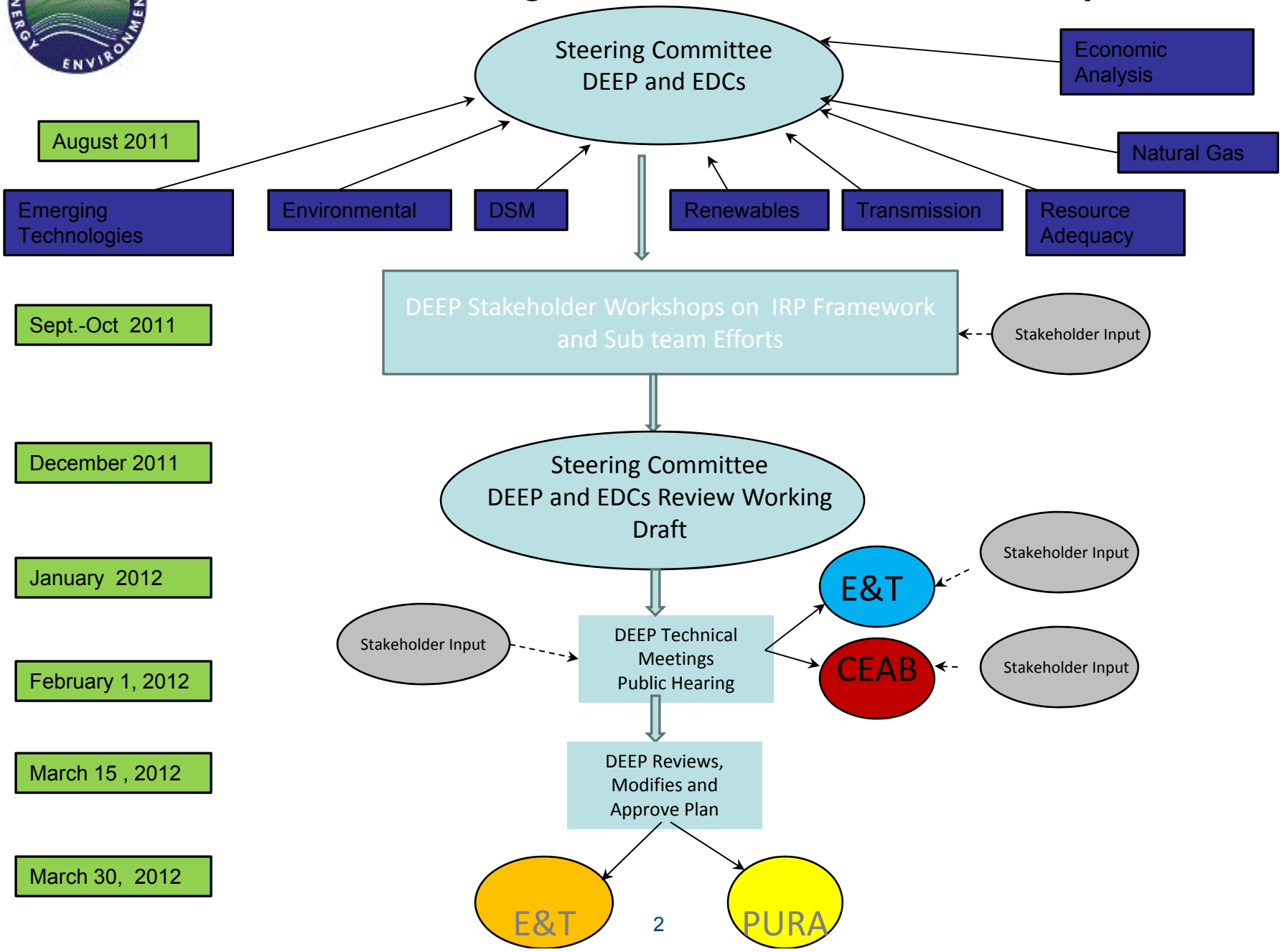
Draft 2012 Integrated Resource Plan for Connecticut

Summary of Findings and Recommendations

Prepared by:
The Connecticut Department of Energy & Environmental Protection (DEEP)

March 14, 2012

2012 Integrated Resources Plan Development



Agenda

- **Introduction**: Purpose and Context
- **Ten-Year Energy Outlook**
  - Rates
  - Consumption
  - Reliability
  - Environment: emissions and renewables development
  - Uncertainty under alternative “Futures”
- **Resource Scenario Impacts** on Rates, Costs, Emissions, and Jobs
  - Expanded Energy Efficiency
  - RPS Flexibility
  - New Cost-of-Service Generation
  - Future considerations
- **Recommendations**

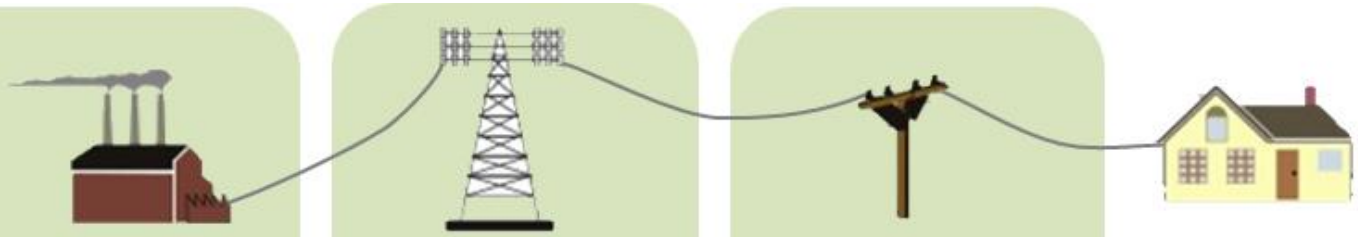
Purpose

- Identify strategies to improve Connecticut's energy future: "cheaper, cleaner, and more reliable."

- One of the measures of success will be for Connecticut to be recognized as a national leader in achieving cost-effective energy efficiency.

- Policies should support increased employment in-state.

Market and Regulatory Context of this IRP



	Generation	Transmission	Distribution	Consumption
Asset Owners	*Independent Power Producers* • purchase generation fuels • generate electricity • sell electricity to retailers	*Electric Distribution Companies* • build, own, and maintain transmission	*Electric Distribution Companies* • build, own, and maintain distribution equipment	*Customers* • consume power in end-use equipment • pay bills to cover upstream costs
System Operators	*ISO New England* • administers wholesale markets • ensures resource adequacy	*ISO New England* • plans new transmission • operates the system reliably	*Electric Distribution Companies* • monitor distribution system • meter and bill customers • administer efficiency programs	
Regulators	*Federal Energy Regulatory Commission* • regulates wholesale markets	*Federal Energy Regulatory Commission* • regulates rates	*CT Public Utility Regulatory Authority* • regulates rates, oversees performance • regulates efficiency programs	
	U.S. EPA, DEEP • promulgate & implement environmental regulations	*State Siting Board* • approves new projects	*CT Energy Efficiency Board (Chaired by DEEP)* • helps develop energy efficiency programs	

Ten-Year Energy Outlook

Recent Connecticut Infrastructure Developments

Transmission

- In 2013-16, the New England East-West Solution (NEEWS) will address reliability (transmission security) issues in and surrounding Connecticut
- Already addressed long-standing reliability problems in SWCT (2006-08)

Generation

- New long-term contracts with Kleen Energy (620 MW CC), new peakers for local contingencies (506 MW GTs), Waterbury (96 MW GT)
- Earlier generation added by the market: Bridgeport Energy (461 MW CC), Milford (507 MW CC), Cos Cob (39 MW GT)

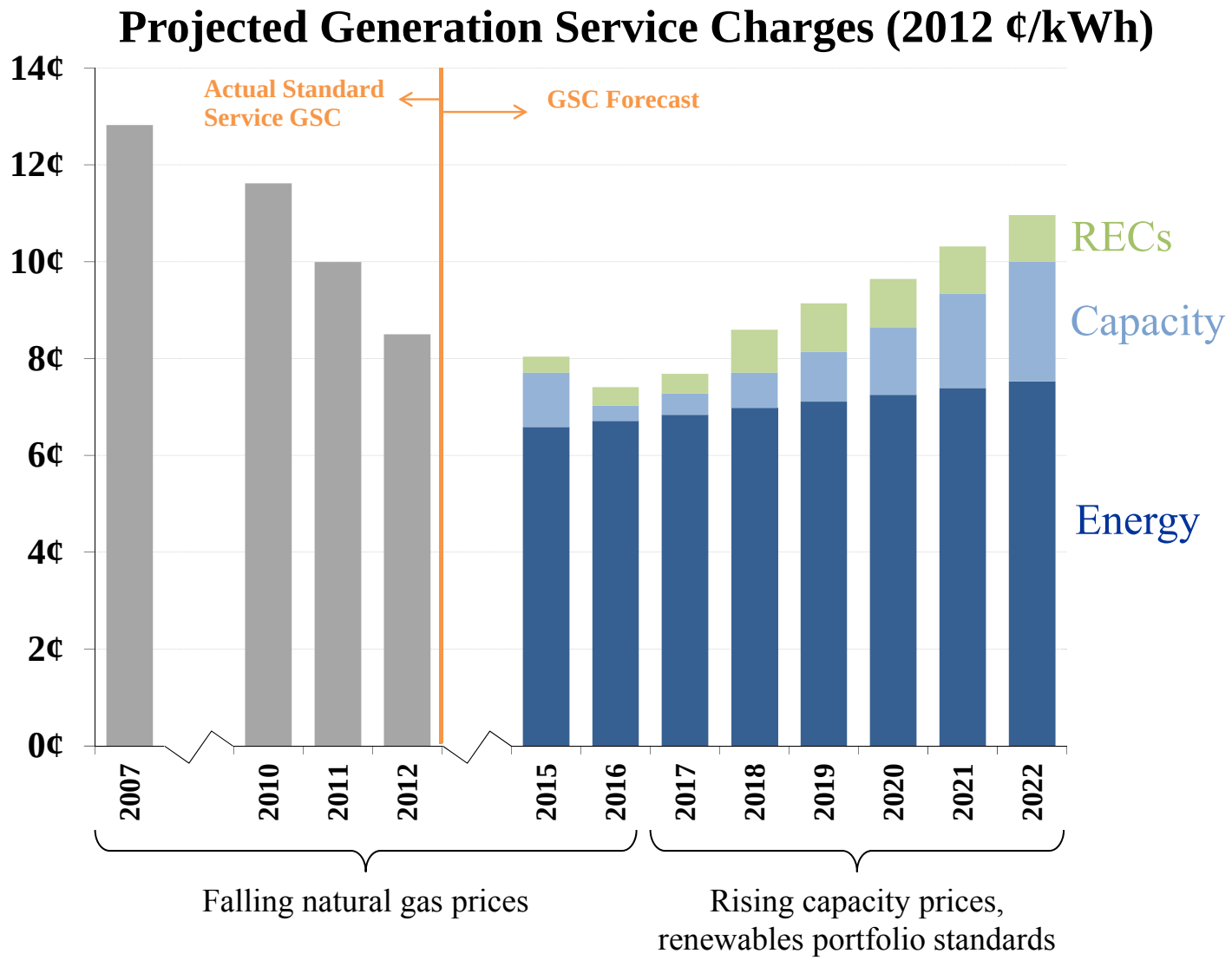
Demand-Side

- Has been funding energy efficiency programs at ~$100 million per year, and policies recognized by the American Council for an Energy Efficient Economy (ACEEE) as the 8th best state; indicates room for improvement
- More than 500 MW Active DR, much of this provided by the market

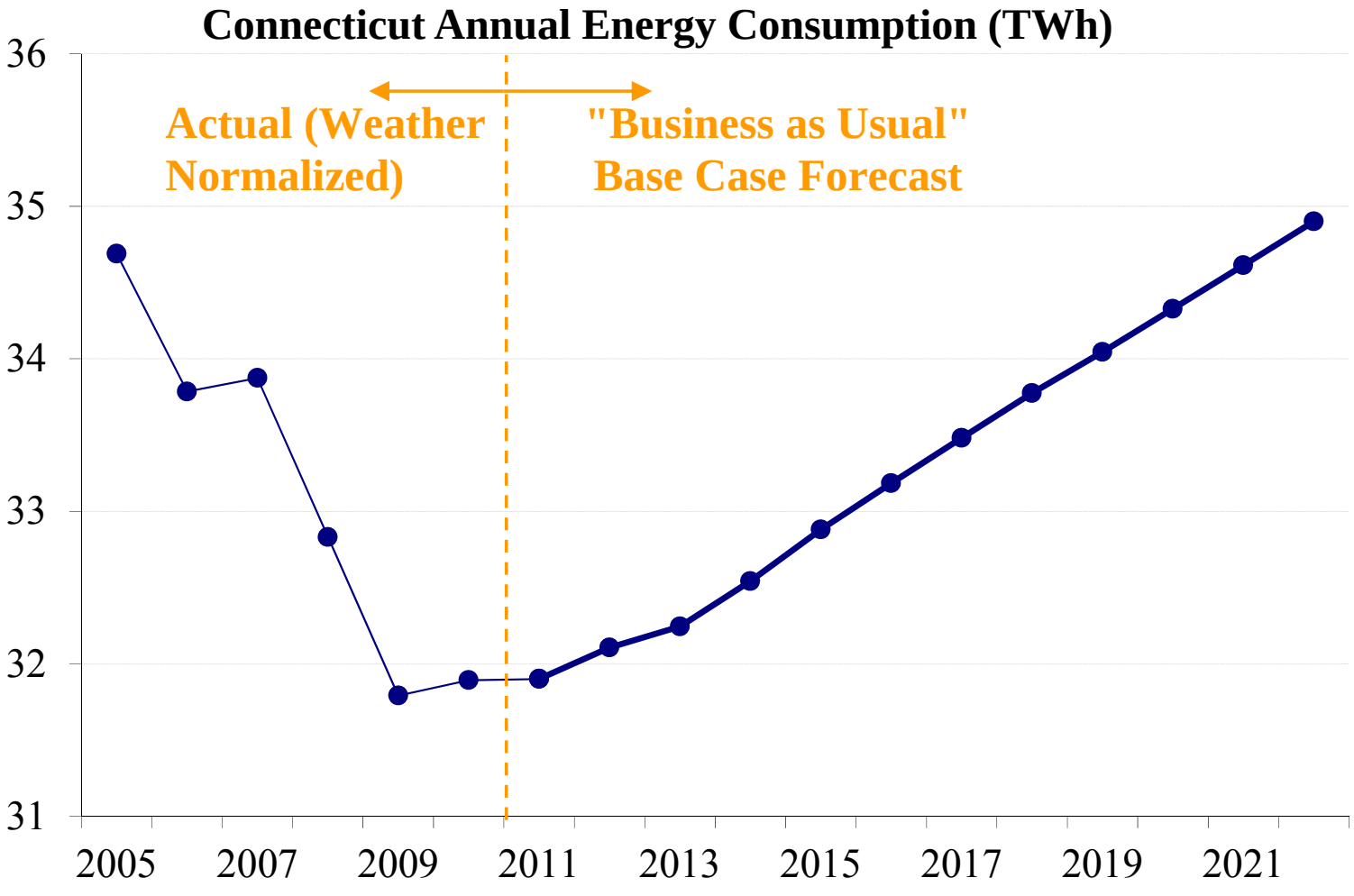
Special Renewables Programs

- Project 150
- ZREC, LREC, and other programs

Rates: Generation Service Charge Relief Expected through 2016, Followed by Increases



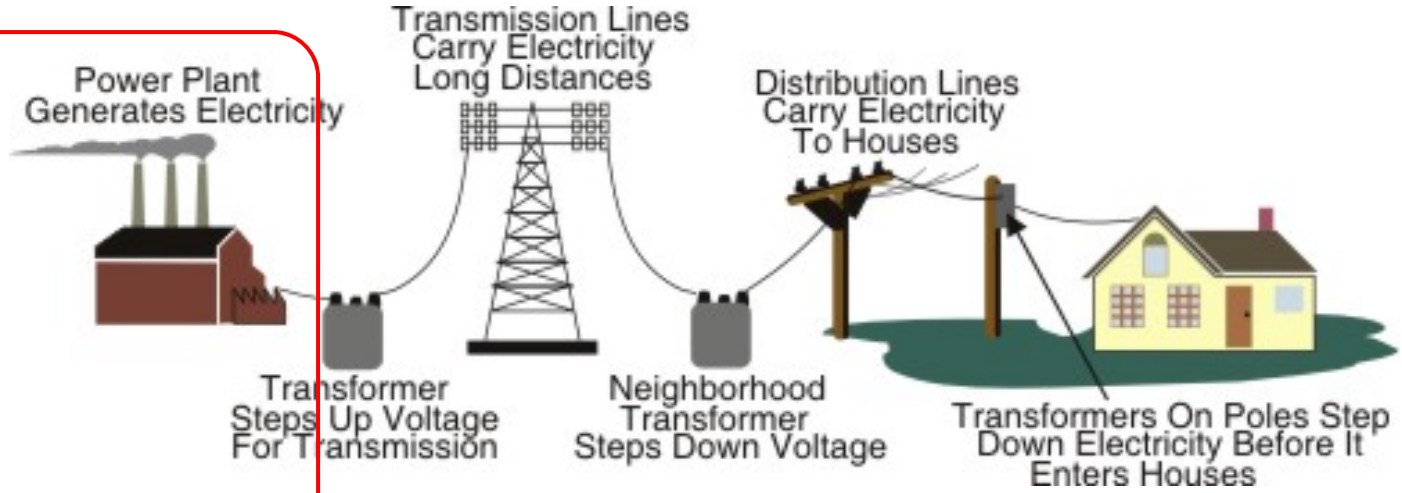
Consumption: Connecticut Energy Demand is Projected to Recover at 0.9% per Year



Sources: 2005-08: ISO-NE; 2009-10: *Brattle* analysis based on ISO-NE's 2011 CELT report.
2012-22: 2011 CELT report, the 50/50 base economic growth load forecast through 2020, then extrapolated at the 2019-20 growth rate.

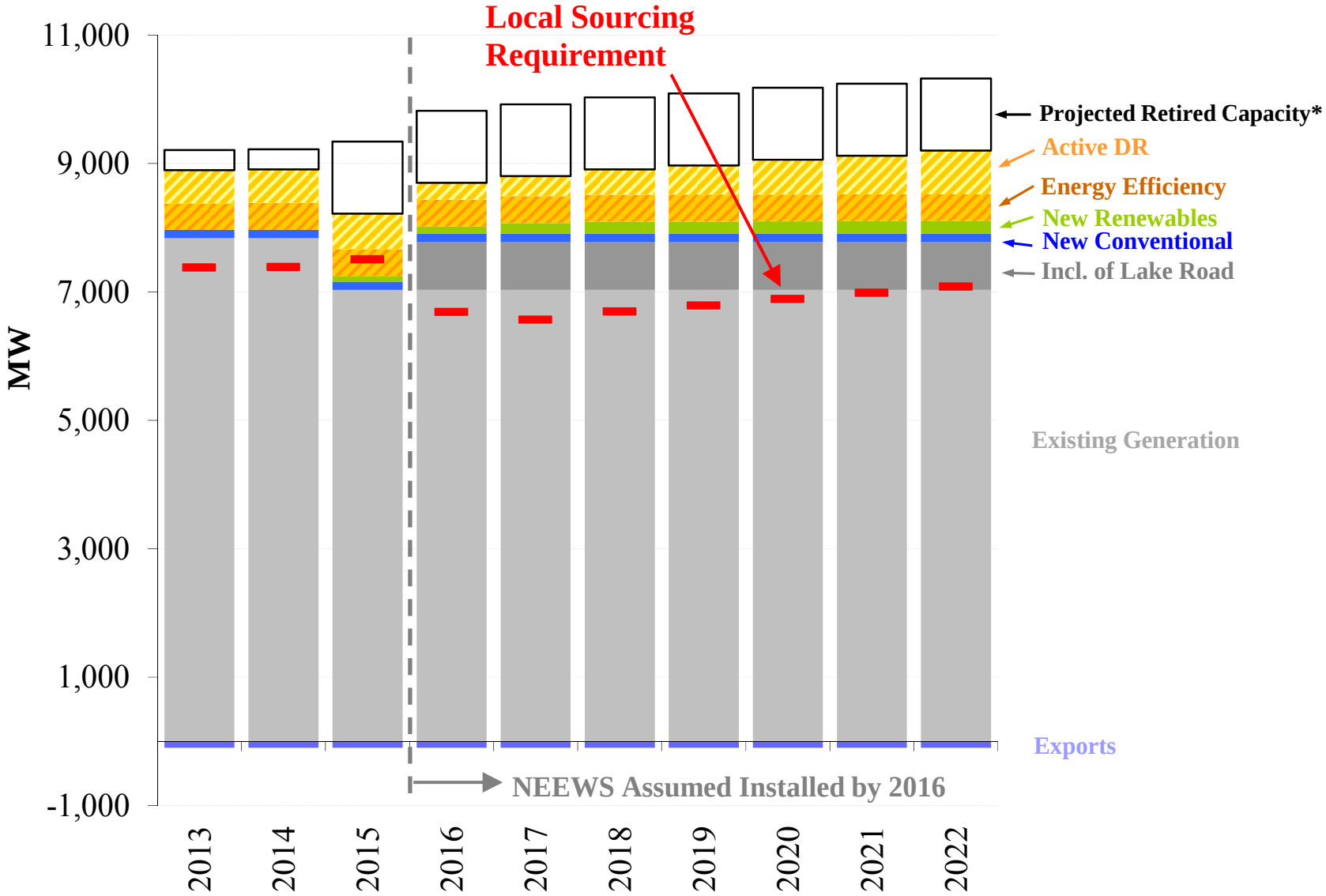
Reliability: Many Components

Scope of Reliability Analysis in IRP

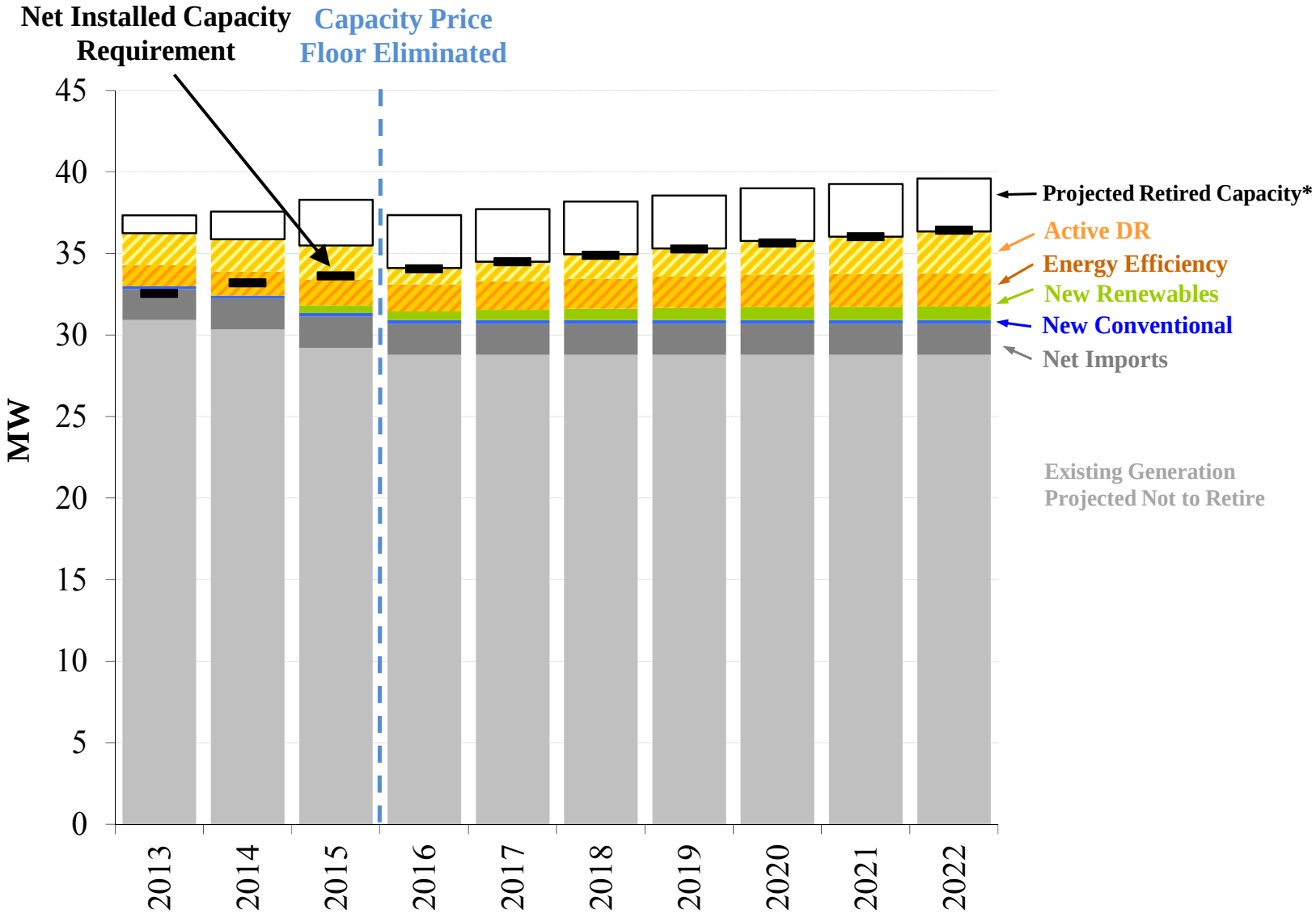


	Resource Adequacy	Transmission Security	Distribution Resilience
Reliability Issues	Must be enough gen (and load management) to meet peak loads, with margin for forecast uncertainty and gen outages	Grid must be maintained and operated to protect individual facilities, and the voltage and stability of the system; plan and operate against contingencies	"Last mile" must be sized and properly maintained to handle peak loads; storm preparedness and response
Primary Criteria	Resource Adequacy Standards	Transmission Security Standards	Duration and Frequency of Outages
Who Ensures	Traditionally, IRP/state; Now primarily ISO-NE	ISO-NE, FERC, NERC, Transmission Owners	Electric Distribution Companies w/DEEP oversight; currently Gov's investigation on storms
Related Factors	Age of equipment Fuel deliverability	Age of equipment Cyber-security and other terrorism	Local policies affecting asset hardening

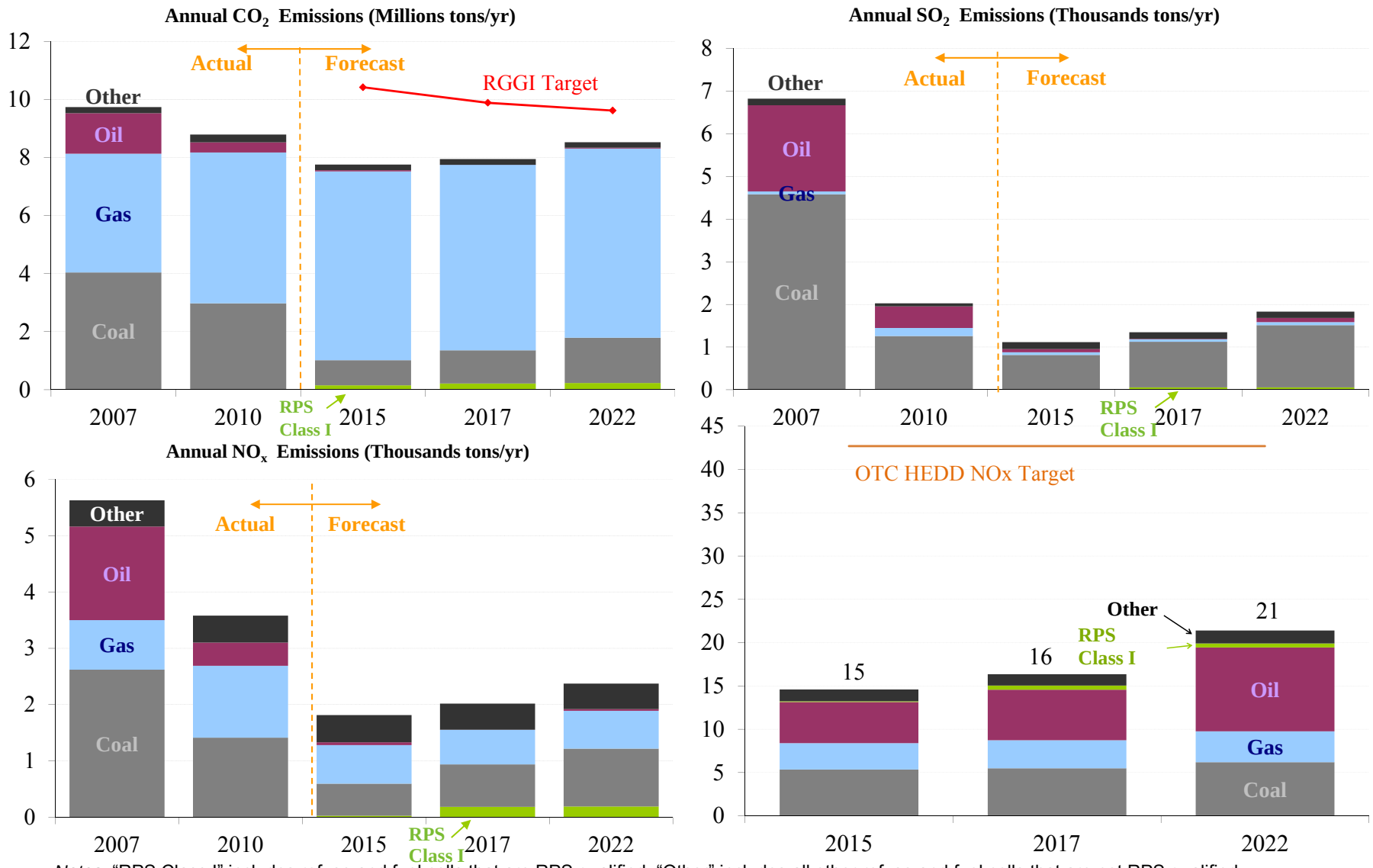
Connecticut Resources Appear Sufficient to Meet Local Resource Adequacy Needs for 10+ Years



Resource Shortages Not Anticipated for the Region

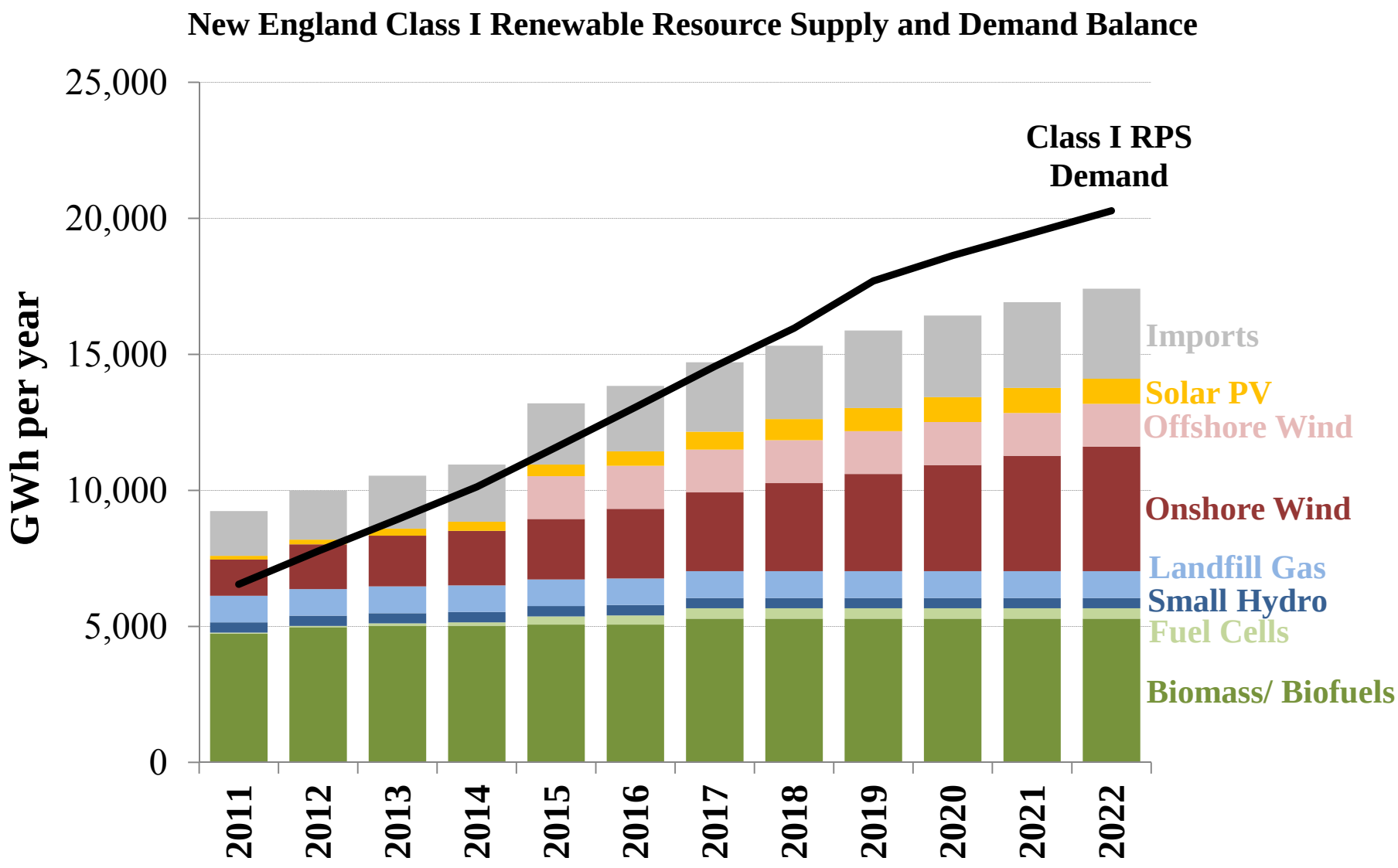


Connecticut Emissions Are Decreasing, Mostly Due to a Shift from Coal & Oil to Natural Gas Generation



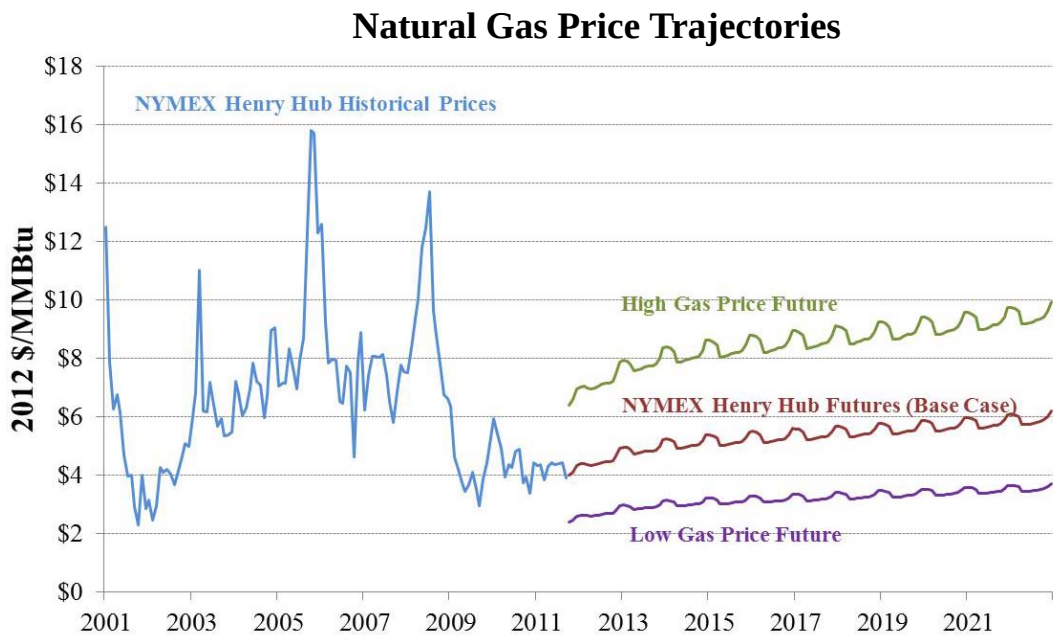
Notes: "RPS Class I" includes refuse and fuel cells that are RPS qualified. "Other" includes all other refuse and fuel cells that are not RPS qualified.

Regional Class I RPS Shortage Projected After 2017



Other Market-Related Uncertainties Analyzed Through Alternative "Futures"

- *High/Low Gas Prices*
- *Abundant Supply*: -1,150 MW load, VT Yankee online
- *Tight Supply*: +1,150 MW load, DR static, Boston shortages solved by transmission



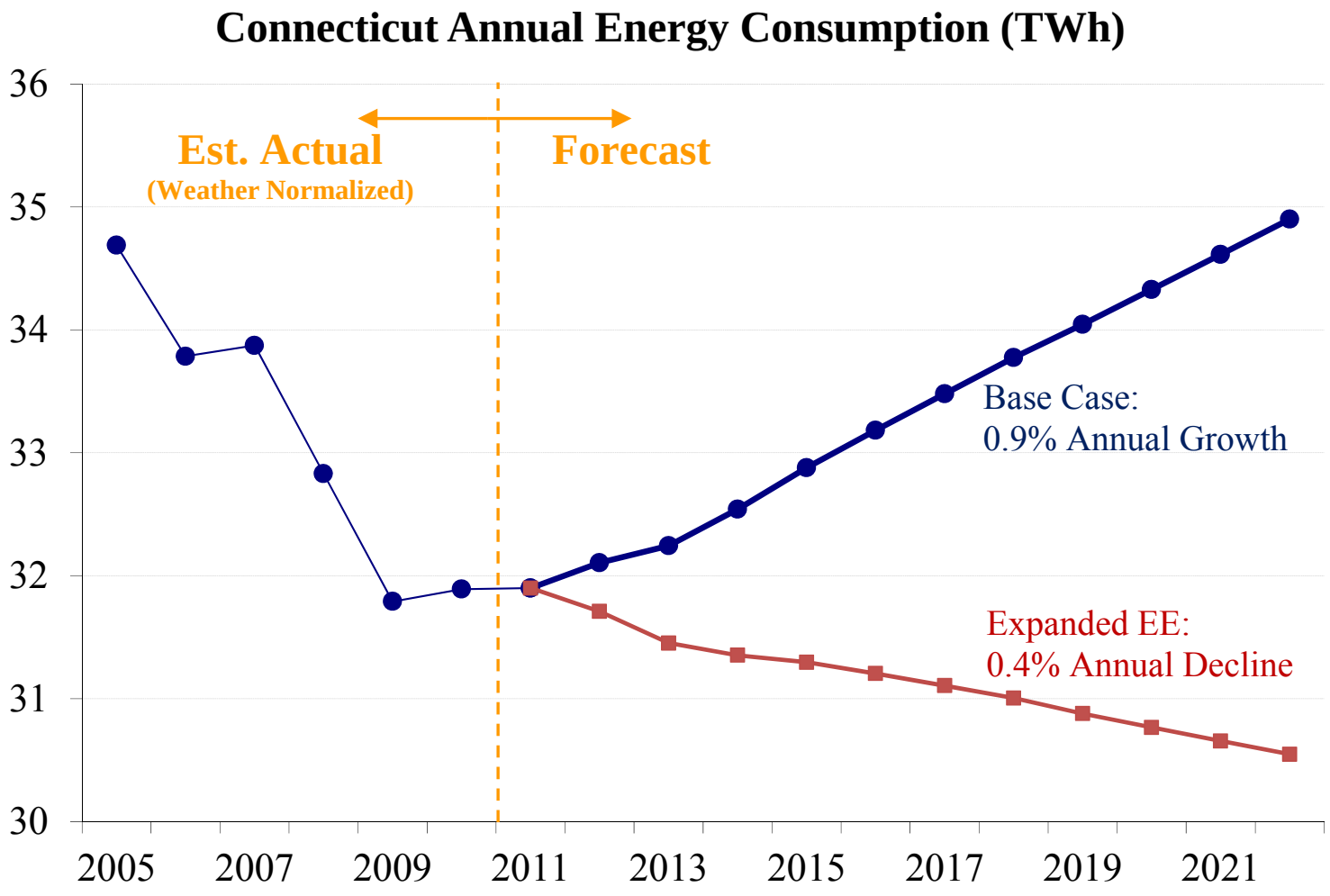
Findings:

- Adequate CT resources across all Futures analyzed.
- New generation could be needed regionally as soon as 2018.
- Gas prices could drive rates about 2 c/kWh higher or lower.

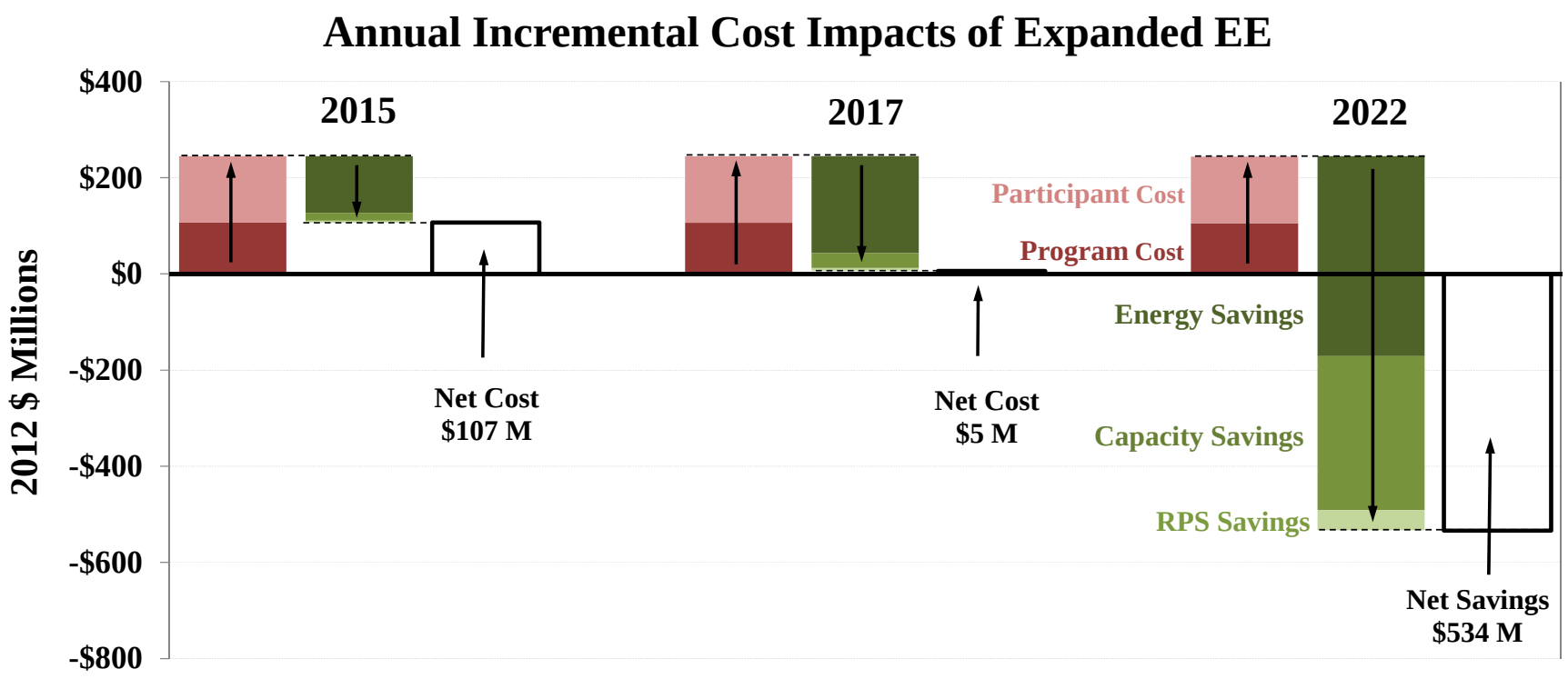
Relatedly, the costs and benefits of alternative resource options differ as external factors vary

Evaluation of Resource Scenarios

"Expanded EE" Scenario (Based on 2010 *Potential Study*) Would Support a Growing Economy that Uses Less Energy



Expanded EE Would Lower Costs in the Long-Term



Expanded EE Would Support In-State Jobs

Category of Spending	Change in Jobs (FTE/year)	Change in state GDP (million/year)
Expanded EE Spending	1,553	193
Lower Cost of Electricity	4,207	776
Reduced spending on in-state renewables	−253	−32
Estimated Net Effect Relative to Base Case	**5,507**	**938**

Uncertainties about Expanded EE

Value depends on market conditions, with energy efficiency serving as a hedge

The quantity and cost of the potential are uncertain

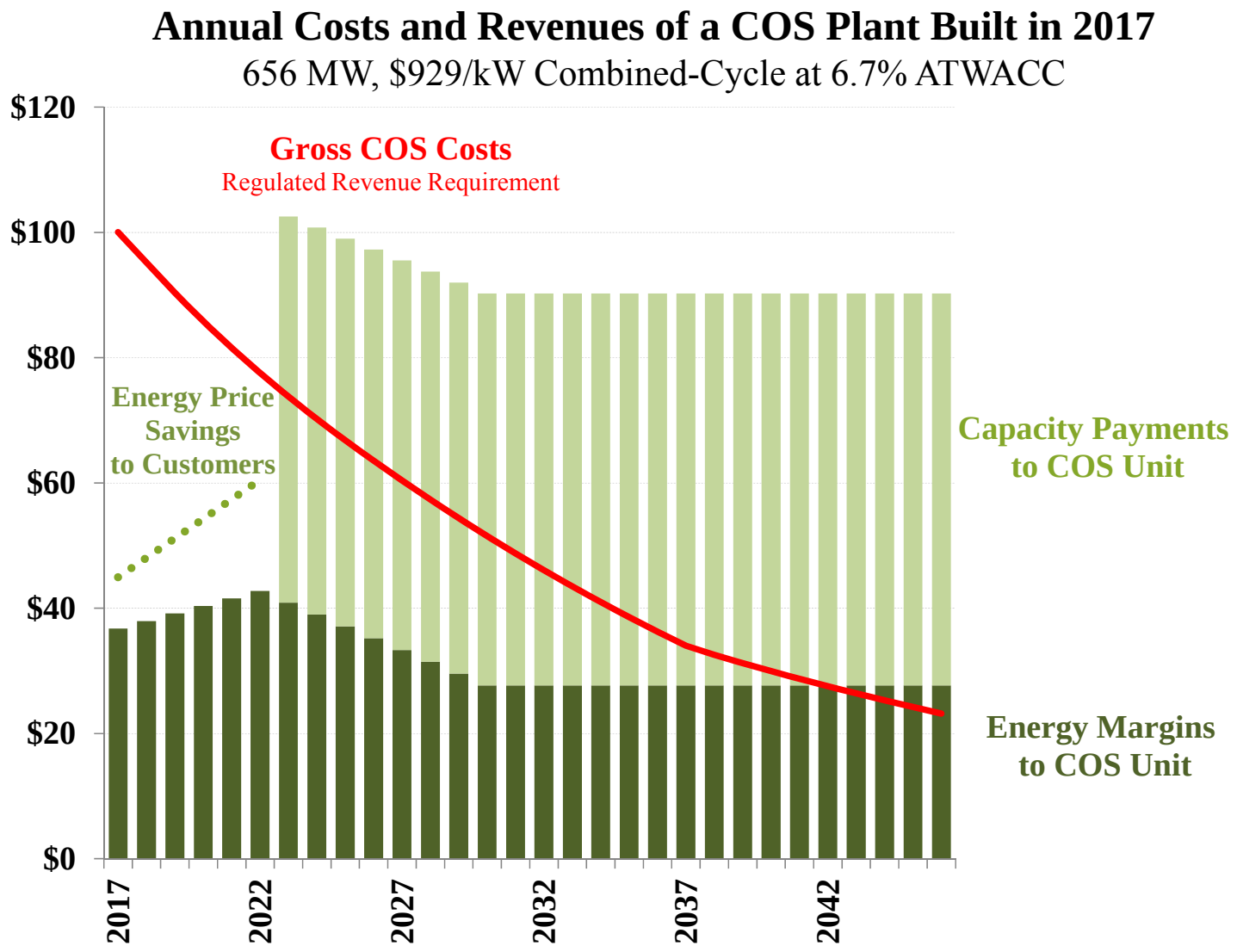
Risk can be mitigated by adjusting programs over time

Class I Flexibility with Expanded EE Would Lower Costs, Rates, and Emissions, and Create Jobs

2022 Benefits of Allowing ¼ of the Class I Requirement to be Met by Expanded EE

	Expanded EE vs. Base Case	**Expanded EE w/ Class I Flex** vs. Expanded EE	**Expanded EE w/ Class I Flex** vs. Base Case
Connecticut Customer Costs			
Net Cost (millions) =	($534)	($152)	($686)
Average Rate (¢/kWh) =	(0.60)	(0.55)	(1.15)
Connecticut Emissions			
CO_2 (kTons) =	(434)	--	(434)
SOx (Tons) =	(234)	--	(234)
NOx (Tons) =	(218)	--	(218)
Macroeconomic Effects			
In-State Jobs (count) =	5,507	636	6,143
State GDP (millions/yr) =	$1,549	$245	$1,795

Cost-of-Service (COS) Generation Likely to Lead to Above-Market Payments



Future Considerations

Emerging Technologies

- Plug-in electric vehicles (PEVs), advanced metering infrastructure (AMI), energy storage, geothermal energy, and advanced waste-to-energy technologies are all unlikely to have major penetration in the next ten years.
- PEVs and AMI, however, have the potential to be important in the long term. The IRP identifies some enabling actions.

Transmission

- No transmission projects or non-transmission alternatives (NTAs) were evaluated in this IRP.
- ISO New England's NTA process will be important over the next year when the ISO conducts a reliability needs analysis including consideration of NTAs for Central Connecticut and Hartford.

Recommendations

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Pursue Expanded Energy Efficiency

- Provide for additional customer funding of EDC programs to support Expanded EE, at $105 million larger annual utility budget than the Base Case ($206 million total).
- Develop innovative approaches to achieving all cost-effective energy efficiency. Consider providing participants low-cost financing through further development of the Green Bank, implementing more aggressive codes and standards, motivating behavioral changes, and other initiatives.
- Adjust size, scope, and approach as appropriate over time.

Recommendations

Increase flexibility in meeting renewable energy targets

- Given the relative cost-effectiveness of energy efficiency as a clean energy resource, allow Class III RECs associated with new energy efficiency to meet a portion of the “Class I” goal.
- Consider allowing other resources, such as out-of-region large hydro-electric or wind power projects, to serve clean energy goals.
- Consider adjusting the ACP level over time.

Do not pursue new cost-of-service generation at this time

- Consider again in the next IRP.
- Meanwhile, monitor resource adequacy, engage with ISO-NE on capacity market evolution, and ensure backstop procurement mechanisms are in place.

Recommendations

Other reliability-related recommendations

- Work with ISO-NE to maintain reliability during winter cold snaps. Assess the compliance of Connecticut generators with their Siting requirements and contractual obligations regarding backup fuel capabilities.
- Pursuant to Governor Malloy's Two Storm Panel Review and recent announcement of additional potential measures for Connecticut to address storm disaster preparedness and recovery, DEEP will continue to investigate the deployment and funding of smartgrid technology in city centers and the use of energy improvement districts as a mechanism to support micro-grids.

DEEP's Schedule for Public Review, Comment and IRP Approval

Issuance of Notice of Technical Meetings and Hearing and Notice of Request for Written Comment	January 17, 2012
Issue Draft IRP	January 17, 2012
Technical Meeting on Overall IRP	February 1, 2012 10:30 am HR 1
Technical Meeting on C&LM Program Expansion	February 1, at 1:00 pm HR1
Technical Meeting (Additional Meeting if Necessary)	February 6, 2012 9:00 am -500 pm HR 2
Comments on Draft IRP Due (45 days)	March 2, 2012
Public Hearing	March 2, 2012 9:30 am HR 1
Issuance of Draft Final IRP	March 30, 2012
Comments on Draft Final IRP Due	April 11, 2012
Final Approval	April 23, 2012
Submission to General Assembly and PURA	April 23, 2012